Polyphase-Discrete Fourier Transform (DFT) Sub-band Definition Filtering Architecture

Abstract of the Invention

A system and method for demultiplexing an RF signal including nested frequency division multiplexed (FDM) channels is disclosed. The system can demultiplex an RF signal including at least two nested sets of FDM channels extending over a bandwidth B. The system can include a baseband converter that converts the RF signal to a baseband signal where the center frequency of the baseband signal is offset from DC by an amount equal to an integer multiple of the channel spacing of a widest of the nested FDM channels; an analog to digital converter (ADC) that converts the baseband signal to a digital signal at a sampling rate equal to four times the offset; a complex baseband digital signal generator, coupled to the analog to digital converter, that performs a half-band complex bandshift of the digital signal and that filters the half-band complex bandshifted signal with a two to one decimating, symmetric, half-band finite impulse response (FIR) filter to generate a complex baseband digital signal; a k stage sub-band definition network, coupled to the complex baseband digital signal generator, that divides the complex baseband digital signal into k sets of sub-band output signals, where each stage of the k stage sub-band definition network can include a plurality of parallel polyphase-discrete Fourier transform (PPF-DFT) filter banks, where the PPF-DFT filter banks, where appropriate to align sub-band signals with filter pass-bands of the PPF-DFT filter banks, can be preceded by a quarter-band or sixth-band complex bandshift, and can be followed by an eighth-band complex bandshift; and sub-band demultiplexers, coupled to the k sets of sub-band output signals, that demultiplex each of the sub-band output signals to obtain k sets of demultiplexed sub-band channel signals.

::ODMA\PCDOCS\DC2DOCS1\259526\3